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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,254	07/12/2006	Kenji Nowara	P29847	9666

7055 7590 06/10/2009

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EXAMINER	
LEE, SIU M	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
06/10/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/577,254	NOWARA, KENJI	
	Examiner	Art Unit	
	SIU M. LEE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/12/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 5 and 9 are objected to because of the following informalities:

(1) Regarding claim 5:

Line 5 recites "products of the real part of the respective outputs", there is a lack of antecedent basis for "the real part".

Line 8 recites "product of the imaginary part of the respective output", there is a lack of antecedent basis for "the imaginary part".

(2) Regarding claim 9:

Claim 9, line 1 recites "A program of instructions for execution by the computer"; there is a lack of antecedent basis for "the computer", the examiner suggests changing it to "a computer".

appropriate correction is required.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 9 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 9 is directed to a program of instruction for execution by the computer to perform a symbol point estimation process.

Program of instruction is directed to the program itself, not a process occurring as a result of executing the program, a machine programmed to operate in accordance with the program nor a manufactures structurally and functionally interconnected with the program in a manner which enables the program to act as a computer component and realize its functionality. It's clearly not directed to a composition of matter. Therefore, program per se is a functional descriptive material and is non-statutory under 35 USC 101.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1, 8, 9, and 10 recite a similar limitation "multiplying a complex conjugate of a frequency component of an ideal signal and a frequency component of the received signal and a sampling angular frequency"; it appears that there are three signals being multiply together. However, figure 1, 3, and 4 only disclose multiplication of the received signal and the ideal signal.

Double Patenting

5. Claims 1 and 8 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 10/512,821. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following comparison.

Claim	Instant application	Claim	Copending application 10/512,821
1	A symbol point estimating apparatus that estimates a symbol point of a received signal by determining a time delay between a sampling point of the received signal sampled at a sampling frequency, and the symbol point of the received signal, comprising: a multiplication/sum of products output means that outputs a sum of products of respective products obtained by multiplying a complex conjugate of a frequency component of an ideal signal and a frequency component of the received signal and a sampling	6	A pattern position measuring device that measures a position of a predetermined pattern in a signal to be measured, comprising: a pattern extraction element that extracts the predetermined pattern as an effective pattern from the signal to be measured based on an approximate position of the predetermined pattern; a spectrum product determining element that determines a product of a frequency spectrum of the effective pattern and data based on a frequency spectrum of the predetermined pattern;

	angular frequency; and a time delay determining means that determines a time delay to minimize an error component between the ideal signal and the received signal based on the output of said multiplication/sum of products output means.		**a phase shift amount measuring element that measures a phase shift amount of the product determined by said spectrum product determining element; a precision pattern position measuring element that measures a difference between the position of the predetermined pattern and the approximate position of the predetermined pattern based on the phase shift amount;**
8	A symbol point estimating method that estimates a symbol point of a received signal by determining a time delay between a sampling point of the received signal sampled at a sampling frequency, and the symbol point of the received signal, comprising: a multiplication/sum of products output step of outputting a sum of products of respective products obtained by multiplying a complex conjugate of a frequency component of an ideal signal and a		a complex conjugate conversion element that converts the frequency spectrum of the predetermined pattern to the conjugate complex; a first fast Fourier transform element that applies fast Fourier transform to the effective pattern so as to output the frequency

	frequency component of the received signal and a sampling angular frequency; and a time delay determining step of determining a time delay to minimize an error component between the ideal signal and the received signal based on the output of said multiplication/sum of products output step.		spectrum of the effective pattern; and a second fast Fourier transform element that applies fast Fourier transform to the predetermined pattern so as to output the frequency spectrum of the predetermined pattern, wherein: said spectrum product determining element determines a complex product of the frequency spectrum of the effective pattern extracted by said pattern extraction element and a conversion result of said complex conjugate conversion element; the signal to be measured has a guard interval positioned prior to the predetermine pattern; and said pattern extraction element starts the extraction of the predetermined pattern from the

			signal to be measured within the guard interval

(1) Regarding claim 1 (the examiner interprets the received signal comprises the sampling angular frequency):

Claim 1 of the co-pending application does not explicitly disclose a time delay determining means.

However, the co-pending application discloses "a phase shift amount measuring element that measures a phase shift amount of the product determined by said spectrum product determining element; and a precision pattern position measuring element that measures a difference between the position of the predetermined pattern and the approximate position of the predetermined pattern based on the phase shift amount". The examiner interprets the precision pattern position measuring element as the time delay determining means because the precision pattern position measuring element measures a difference between the position of the predetermined pattern and the approximate position of the predetermined pattern (time delay) based on the phase shift amount.

(2) Regarding claim 8:

Claim 8 is rejected based on the same rationale of claim 1.

6. Claim 10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 14 of copending Application No.

10/512,821. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following comparison.

Claim	Instant application	Claim	Copending application 10/512821
10	A computer-readable medium having a program of instruction for execution by the computer to perform a symbol point estimating process that estimates a symbol point of a received signal by determining a time delay between a sampling point of the received signal sampled at a sampling frequency, and the symbol point of the received signal, said symbol point estimating process comprising: a multiplication/sum of products output step of outputting a sum of products of respective products obtained by multiplying a complex conjugate of a frequency	14	14. (previously presented) A computer-readable medium having a program of instructions for execution by the computer to perform a pattern position measuring process that measures position of a predetermined pattern in a signal to be measured, said pattern position measuring process comprising: a pattern extraction step of extracting the predetermined pattern as an effective pattern from the signal to be measured based on an approximate position of the predetermined pattern; a spectrum product determining

	component of an ideal signal and a frequency component of the received signal and a sampling angular frequency; and a time delay determining step of determining a time delay to minimize an error component between the ideal signal and the received signal based on the output of said multiplication/sum of products output step		step of determining a product of a frequency spectrum of the effective pattern and data based on a frequency spectrum of the predetermined pattern; a phase shift amount measuring step of measuring a phase shift amount of the product determined by said spectrum product determining step; a precision pattern position measuring step of measuring a difference between the position of the predetermined pattern and the approximate position of the predetermined pattern based on the phase shift amount; a complex conjugate conversion step of converting the frequency spectrum of the predetermined pattern to the conjugate complex; a first fast Fourier transform step

			of applying fast Fourier transform to the effective pattern so as to output the frequency spectrum of the effective pattern; and a second fast Fourier transform step of applying fast Fourier transform to the predetermined pattern so as to output the frequency spectrum of the predetermined pattern, wherein: said spectrum product determining step determines a complex product of the frequency spectrum of the effective pattern extracted by said pattern extraction step and a conversion result of said complex conjugate conversion step; the signal to be measured has a guard interval positioned prior to the predetermine pattern; and said pattern extraction step starts

			the extraction of the predetermined pattern from the signal to be measured within the guard interval.

Claim 10 is rejected based on the same rationale as claim 1.

7. Claim 9 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 10/512821 in view of Langberg et al. (US 5,852,630).

This is a provisional obviousness-type double patenting rejection.

Claim	Instant application	Claim	Copending application 10/512,821

1	A symbol point estimating apparatus that estimates a symbol point of a received signal by determining a time delay between a sampling point of the received signal sampled at a sampling frequency, and the symbol point of the received signal, comprising: a multiplication/sum of products output means that outputs a sum of products of respective products obtained by multiplying a complex conjugate of a frequency component of an ideal signal and a frequency component of the received signal and a sampling angular frequency; and a time delay determining means that determines a time delay to minimize an error component between the ideal signal and the received signal based on the	6	A pattern position measuring device that measures a position of a predetermined pattern in a signal to be measured, comprising: a pattern extraction element that extracts the predetermined pattern as an effective pattern from the signal to be measured based on an approximate position of the predetermined pattern; a spectrum product determining element that determines a product of a frequency spectrum of the effective pattern and data based on a frequency spectrum of the predetermined pattern; **a phase shift amount measuring element that measures a phase shift amount of the product determined by said spectrum product determining element;** **a precision pattern position**

	output of said multiplication/sum of products output means.		**measuring element that measures a difference between the position of the predetermined pattern and the approximate position of the predetermined pattern based on the phase shift amount;** a complex conjugate conversion element that converts the frequency spectrum of the predetermined pattern to the conjugate complex; a first fast Fourier transform element that applies fast Fourier transform to the effective pattern so as to output the frequency spectrum of the effective pattern; and a second fast Fourier transform element that applies fast Fourier transform to the predetermined pattern so as to

			output the frequency spectrum of the predetermined pattern, wherein: said spectrum product determining element determines a complex product of the frequency spectrum of the effective pattern extracted by said pattern extraction element and a conversion result of said complex conjugate conversion element; the signal to be measured has a guard interval positioned prior to the predetermine pattern; and said pattern extraction element starts the extraction of the predetermined pattern from the signal to be measured within the guard interval

Claim 6 of the copending application discloses all subject matter as discussed in claim 1 except the process is perform by a program of instruction for execution by a computer.

However, Langberg et al. teaches that the method and apparatus for a transceiver warm start activation procedure with precoding can be implemented in software stored in a computer-readable medium. The computer-readable medium is an electronic, magnetic, optical, or other physical device or means that can be contain or store a computer program for use by or in connection with a computer-related system or method (column 3, lines 51-65). One skilled in the art would have clearly recognized that the process the copending application would have been implemented in a software. The implemented software would perform same function of the hardware for less expense, adaptability, and flexibility. Therefore, it would have been obvious to have used the software in the copending application as taught by Langberg et al. in order to reduce cost and improve the adaptability and flexibility of the communication system.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eberlein et al. (US 6,993,094 B1) in view of Laroia et al. (US 7,027,429 B2).

(1) Regarding claim 1 (the examiner interprets the received signal comprises a sampling angular frequency):

Eberlein et al. discloses an apparatus comprising:

a multiplication/sum of products output means (correlator 442, 446, multiplier 445, and maximum searching block 447 in figure 7) that outputs a sum of products of respective products obtained by multiplying a complex conjugate of a frequency component of an ideal signal and a frequency component of the received signal and a sampling angular frequency (equation in column 11, lines 45-49 discloses a equation for estimating the carrier frequency deviation as follows:

$$\Delta f = \frac{1}{2\pi \frac{L}{2} T_{MCM}} \arg\left(\sum_{k=1}^{\frac{L}{2}} \left[\tilde{r}\left(k + \frac{L}{2}\right) \cdot \tilde{r}^*(k) \right] \cdot \left[S_{AM}(k) S_{AM}^*\left(k + \frac{L}{2}\right) \right] \right)$$

from the equation above, it is calculating a sum of the product of (r(k+l/2) x r*(k)) and ($S_{AM}(k)S^*_{AM}(k+L/2)$), figure 7 shows FFT unit 440 and 444 and then correlating in correlator 442 and 446, column 10, line 64 - column 11, line 4).

Eberlein et al. discloses estimating a frequency offset based on the output of said multiplication/sum of product output means but fail to disclose a time delay determining

means that determines a time delay to minimize an error component between the ideal signal and the received signal based on the output of said multiplication/sum of products output means.

However, Laroia et al. discloses a time domain correlation estimator 266 in figure 9 that after determining a frequency offset estimate, the time offset can be estimated based on the frequency offset, and the column 6, lines 48-54.

It is desirable to have a time delay determining means that determines a time delay to minimize an error component between the ideal signal and the received signal based on the output of said multiplication/sum of products output means because the time and frequency synchronization can be preformed jointly in a computationally efficient manner without having the transmitter sending extra pilot and improve the bandwidth efficient (column 8, lines 18-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Laroia et al. in the apparatus of Eberlein et al. to improve the computational efficiency and bandwidth efficiency.

(2) Regarding claim 2:

Eberlein et al. discloses said multiplication/sum of products output means comprises:

a frequency component product output means (correlator 442 and 446 in figure 7) that outputs the product of the complex conjugate of the frequency component of the ideal signal and the frequency component of the received signal (the demultiplexer 404 and 424 recovers the two identical sections having the length of L/2 each from the L

samples, column 9, lines 52-57, the examiner interpret one of the section as a receiver signal and the other one as a ideal signal, the equation discuss in claim 1 discloses that a product of a section is multiply with a conjugate of the other section)

$$\left[\vec{r}\left(k+\frac{L}{2}\right)\cdot\vec{r}^{*}(k)\right]\cdot\left[S_{AM}(k)S_{AM}^{*}\left(k+\frac{L}{2}\right)\right]$$

; and

a sum of products output means that outputs the sum of products of the respective outputs of said frequency component product output means and the sampling angular frequency (a sum of the multiplication is generate by the maximum searching block 447 as shown in the equation in column 11, lines 45-49).

$$\sum_{k=1}^{\frac{L}{2}}\left[\vec{r}\left(k+\frac{L}{2}\right)\cdot\vec{r}^{*}(k)\right]\cdot\left[S_{AM}(k)S_{AM}^{*}\left(k+\frac{L}{2}\right)\right]$$

10. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eberlein et al. (US 6,993,094 B1) in view of Laroia et al. (US 7,027,429 B2) and Langberg et al. (US 5,852,630).

Eberlein et al. and Laroia et al. disclose all subject matter as discussed in claim 1 except the process are perform by a program of instruction for execution by a computer.

However, Langberg et al. teaches that the method and apparatus for a transceiver warm start activation procedure with precoding can be implemented in software stored in a computer-readable medium. The computer-readable medium is an electronic, magnetic, optical, or other physical device or means that can be contain or

store a computer program for use by or in connection with a computer-related system or method (column 3, lines 51-65). One skilled in the art would have clearly recognized that the process the copending application would have been implemented in a software. The implemented software would perform same function of the hardware for less expense, adaptability, and flexibility. Therefore, it would have been obvious to have used the software in the copending application as taught by Langberg et al. and Laroia et al. in order to reduce cost and improve the adaptability and flexibility of the communication system.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Taura et al. (US 6,148,045) discloses a digital broadcast receiver.

Kim (US 2004/0179625 A1) discloses a coarse frequency synchronization method and apparatus in OFDM system.

Mori (US 5,745,535) discloses a precision symbol discrimination timing detection system for multi-carrier modulation signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Siu M Lee/
Examiner, Art Unit 2611
6/5/2009

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611